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The Role of Child Health and Economic Status in Educational, Health and Labour Market Outcomes in Young Adulthood

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Abstract

The Ontario Child Health Study provides the first opportunity in Canada to assess directly the relationship between socio-economic and health status in childhood and levels of completed schooling, health status and labour market success in young adulthood. We find that childhood health problems are negatively associated with educational attainment, especially the probability of a university degree, and the health status of young adults. Our results also imply that childhood health problems influence adult labour force outcomes, especially for males, mainly through adult levels of schooling and health.

JEL Classification: Health Education and Welfare

Keywords: Child Health, Adult Outcomes

1. Introduction

The overall objective of this paper is to examine the links between economic and health status in childhood and both economic and health outcomes in young adulthood. We focus on two specific questions. First, what is the relationship of physical and behavioural-emotional health problems in childhood with schooling, health and labour market outcomes in young adulthood? Second, what is the role of health status in the intergenerational correlation of economic status? In answering these questions, we build upon two streams of Canadian research. In the first stream, the National Longitudinal Survey of Children and Youth (NLSCY) has been used to establish the link between parental income and both the physical health (Currie and Stabile 2003) and the behavioural-emotional well-being (Dooley and Stewart 2007) of Canadian children. The second stream focuses on inter-generational economic mobility. Data sources such as the Survey of Labour and Income Dynamics (SLID) have been used to examine the relationship between parental income and participation in post-secondary education (Zhao and Broucker 2001). Estimates of the inter-generational correlation in levels of education (Sen and Clemente 2006) and earnings (Corak and Heisz 1995, 1998, 1999) have been provided by the General Social Surveys (GSS) and longitudinally linked administrative data. None of the studies in these two streams have been able to address the questions posed in this study due to the absence of measures of both childhood health status and adult outcomes. The NLSCY will eventually contain both such measures but the oldest children in this survey are still in their early twenties.

The Ontario Child Health Study (OCHS) is the first Canadian socio-economic

data set that measures childhood health outcomes and then follows those children into their late twenties and early thirties. The 1983 OCHS was a random sample of the families of children age 4-16 in 1983. The focus of the original survey was on childhood health and development but data were also collected on a limited set of socioeconomic measures. The 2000 OCHS follow-up succeeded in enlisting almost three-quarters of the children who participated in the 1983 survey.

In this paper, we use data on child and family characteristics in the 1983 OCHS (parental income and education, and child health) and socio-economic outcomes in the 2000 OCHS (educational attainment, health, earnings, wages, and hours of paid work) to provide answers to the two key questions posed at the start of this section. Such answers can shed light on important policy questions. What are the potential long run implications of health problems early in the life cycle for the eventual cost of health care and income support programs? What role does childhood health play in the relatively high degree of inter-generational economic mobility in Canada (Corak 2006)? We review the literature in Section 2 and provide a description of the OCHS and our estimation samples in Section 3. Section 4 presents our multivariate estimates and Section 5 is a summary and conclusion.

2. Literature Review

Our goal in this paper is to use OCHS data to estimate the following model:

$$AO_i = \alpha_0 + \alpha_1 \text{Ln FI}_i + \alpha_2 X_i + \alpha_3 PH_I + \alpha_4 CH_i + \upsilon_i \quad (1)$$

where, for the ith child, CH is an indicator of child health, FI is family income in 1982,

PH is an indicator of parental health, AO is an adult outcome (schooling, health or labour force) and X is a vector of other relevant characteristics such as age, sex, and parental education. A closely related literature is interested in the determinants of child health as reflected in the following model:

$$CH_i = \beta_0 + \beta_1 \text{ Ln } FI_i + \beta_2 X_i + \beta_3 PH_i + \varepsilon_i \quad (2)$$

As indicated in the Introduction, the first question of interest in this paper is the effect of child health on adult outcomes, that is, estimates of α_4 in Equation (1). The second question of interest concerns the role of health status in the intergenerational correlation of economic status, that is, how do the characteristics of parents (income, education, and health) influence the adult outcomes of their children both directly (α_1 in Equation 1) and indirectly via child health (β_1 in Equation 2)? A key challenge in estimating both equations above is the high likelihood that elements of ε and υ are correlated with observed determinants of both CH and AO, in particular FI. As we explain in more detail in Section 3, the OCHS shares the limitations of most data sets in confronting this challenge.

We begin the review with a brief look at the literature concerned with the estimation of Equation 2 and focus on the indicators of child health from the OCHS that we use in the current paper: chronic conditions, functional limitations, and conduct and emotional disorders. Case et al. (2002) were among the first to show that the income-health gradient often reported for adults also exists among children in the U.S. and becomes steeper as children age. The association between income and specific chronic conditions was statistically significant, however, for only a minority of conditions and had a small size effect. Currie and Lin (2007) have confirmed these findings with more

recent US data. Currie et al. (2006) report a positive relationship between family income and overall child health status in England, but, in comparison with Case et al. (2002), their results suggest a flatter gradient and a generally weak relationship between income and chronic conditions.[i] Using other English data sources, Doyle et al. (2007) find a relatively strong income–health gradient for children but Propper et al. (2007) do not.

Currie and Stabile (2003) use data from the NLSCY and reach conclusions similar to Case et al. (2002) with regard to general health, i.e., the income-health gradient steepens with age but has a modest elasticity (0.2 to 0.5). [ii] de Oliveira (2007) adds measures of parental health to the Currie and Stabile model and reports that the income coefficients decrease in absolute size and do not have a positive interaction with age beyond the age of four. Currie and Stabile do not regress chronic conditions on income but de Oliveira (2008) reports that this link is statistically significant for only half of the conditions considered and is almost never significant when parental health is added to the model. Other studies that have found no empirical link between family income and childhood chronic conditions include Nehum (2006) using the Swedish Survey of Living Conditions and Lefebvre (2006) using the Quebec Longitudinal Survey of Child Development.

Dooley and Stewart (2007) use data from the NLSCY to estimate the relationship between family income and measures of the behavioural-emotional well-being of children. Their estimated income effects are similar in size to those found by Blau (1999) and Mayer (1997) with the (US) NLSY. Specifically, an increase in family income from the poverty line to twice that level is associated with a decrease of about 0.15 to 0.10 of a standard deviation in the measures of behavioural and emotional

problems. Dooley and Stewart did not, however, explore the question of whether or not the income gradient becomes steeper as children age. In summary, the estimates of the effect of family income on child health range from zero to modest in size but are obtained with data that generally do not afford good means of identifying causal effects. Recently however, Milligan and Stabile (2008) have exploited differences in Canadian child benefits across province, time, and family type and estimated somewhat larger income effects on test scores as well as several measures of both child and maternal mental health.

We now turn to empirical studies of Equation 1 above, most of which do not include measures of child health. One strand of the research on inter-generational socioeconomic mobility has focused on the relationship between parental income and participation in post-secondary education. Christofides, Cirello and Hoy (2001), Zhao and Broucker (2001) and Corak, Lipps and Zhao (2005) use a variety of data sources and report that university attendance increases with parental income and that, on balance, the strength of this association has not risen over the recent past as tuition and fees have grown. Using data from the National Graduates Survey and the Labour Force Survey, Neill (2008) finds that the positive effects of non-repayable assistance and loans on the level and type (away from home or not) of university enrolments are concentrated among the children of parents with lower levels of education. Coelli (2009) uses the SLID and reports that recent tuition fee increases have coincided with reductions in the university enrolment of low income youth, but with significantly smaller changes for other young persons. Sen and Clemente (2006) also use data from the 1986, 1994 and 2001 GSS but focus on the intergenerational correlation in educational attainment. They report that

having a parent with postsecondary education is associated with a 20% greater likelihood of a postsecondary diploma or degree and a 39% earnings premium.

A second strand of research on inter-generational mobility focuses on income and/or earnings in both generations. Corak and Heisz (1995, 1998, 1999) use income tax data from the Longitudinal Administrative Database (LAD) to estimate the inter-generational earnings and income elasticity (IGE). The IGE is the coefficient obtained from regressing, most commonly, the log of the son's earnings on the log of the father's earnings controlling for the ages of both. Tax data provide good measures of permanent income but not of other income determinants most importantly education. Fortin and Lefebvre (1998) use the GSS of 1986 and 1994 and obtain IGE estimates similar to those found by Corak and Heisz.

In summarizing the Canadian research on inter-generational income mobility, Corak (2006) reports that his preferred estimate of the IGE is 0.19 which places Canada among high mobility societies such as Finland and Sweden. Low mobility societies include the US and UK with IGE's of 0.47 and 0.50 respectively. Corak (2004) discusses several reasons for high Canadian mobility including a low private rate of return on education and a relatively weak impact of parental education on the cognitive skills of children. Other possibilities include weak associations between parental income and child health and/or between child health and adult incomes.

The key questions posed in this paper concern Equation 1 above, that is, the relationship of physical and behavioural-emotional health problems in childhood with schooling, health and labour market outcomes in young adulthood. Research on this topic is quite limited due to the need for a long panel and the challenge of uncovering

causal relationships given the likely importance of genetic factors and unobserved early life experiences.[iii] Two recent Canadian papers are insightful but can only follow children into the teen years. Currie and Stabile (2006) find that attention deficit hyperactivity disorder among U.S. and Canadian children increases the probability of delinquency and grade repetition, reduces future reading and mathematics scores, and increases the probability of special education in adolescence. Currie et al. (2008) use a large administrative data set of siblings from Manitoba to demonstrate that health problems, and especially mental health problems in early childhood, are significant determinants of various education outcomes and the likelihood of welfare use in adolescence.

There are, to our knowledge, no Canadian precedents for the estimated links between childhood health and adult socioeconomic status provided by the OCHS in this paper. Data from other countries provide longer panels. Case, Fertig and Paxson (2005) use the 1958 UK National Child Development Study and find that, conditional on parental income and school-leaving age, children who experienced chronic conditions in childhood have significantly lower educational attainment, poorer health and lower employment and occupational statuses as adults. Childhood chronic conditions even have a direct association with health and economic status at age 42 when controlling for such characteristics in early adulthood.

Smith (2008) uses data from the Panel Study of Income Dynamics and reports that poor childhood health has a quantitatively large effect on years of schooling, individual earnings and labour supply, and family income and wealth. These measured effects, save for years of schooling, also hold in a sibling fixed effects model. Case,

Fertig and Paxson do not have siblings but do have chronic conditions reported during childhood whereas the only variable available to Smith is a retrospective measure of general childhood health status asked of one person for all adults in the household. The OCHS does have siblings and extensive health measures obtained during childhood but only one observation of adult outcomes.

In summary, previous research has consistently reported an empirical link between family income and childhood health. There is also support for a link between childhood health problems and adult outcomes but this literature is more limited due to data demands. We examine both questions using the OCHS focusing on whether childhood health has an independent effect on adult outcomes.

3. OCHS Design, Measures and Summary Statistics

The 1983 OCHS survey and measures are described in detail in Boyle et al. (1987) and Curtis et al. (2001). The sampling frame in 1983 included all children born from January 1, 1966 through January 1, 1979, whose usual place of residence was in a household dwelling in Ontario. Among eligible households sampled, 1869 (91.1%) agreed to participate in the OCHS. There were 3294 children (922 aged 4-7 years; 1357 aged 8-12 years; and 1015 aged 13-16 years). Data were collected from parents (usually the mother), adolescents and teachers. [iv]

The 2000 OCHS follow-up attempted to enlist all children who participated in the original OCHS in 1983. The actual participants in 2000 consisted of 2409 out of 3294 (73.1%) young adults from the 1983 sample.[v] Live-in partners or spouses also completed

a questionnaire. Boyle (2004) reports that non-participants in the 2000 sample came from families that were among the less privileged in 1983, specifically, families that were disproportionately likely to have one parent, low income, welfare income, and a rental dwelling. Despite this, the OCHS 2000 respondents were quite similar to a sample of age-matched peers from Ontario in the 2000 Canadian Community Health Survey in terms of marital status, perceived health, chronic conditions, employment, education and personal income. We compared respondents from the 2000 OCHS with respondents from the SLID. Our judgment is that the characteristics of respondents in these two samples are reasonably similar especially given differences between the surveys in questions and time frames. A detailed comparison of the 2000 OCHS and the SLID samples is available in Section 1 of the Web Appendix.

Table 1 provides summary statistics for each of the two main sub-samples that we use in our multivariate analysis. We use OCHS 2000 respondents from all age categories to analyse educational and health outcomes in young adulthood. Only those aged 25-35 (and with positive earned income and hours of paid work) were used for the analyses of earned income and hourly wages. The 1983 family income measure was categorical. See Section 2 of the Web Appendix for a detailed explanation of how income values were assigned to different categories. In general, the values of the summary measures in Table 1 for OCHS families in 1983 are similar to those of the average family with young children in Ontario in the 1983 Survey of Consumer Finances (not shown). One exception is that only 9% of children in the 1983 OCHS are in lone mother families compared to 14% in the SCF. This difference is also true of the full 1983 OCHS sample and not just those who responded in the OCHS 2000.

Our indicator of a childhood physical health problems takes on a value of 1 if the parent reports the presence of either a functional limitation or a chronic medical condition. Table 1 indicates that 18% of the OCHS children had one or both of these problems. Five per cent had a functional limitation and 16% had a chronic condition. In the Case et al. (2005) sample, 9% (14%) of children had a chronic condition at age 7 (16). In de Oliveira (2008), 29% of children in the NLSCY had a chronic condition or activity limitation but this includes 16% with allergies, a condition that was not included in the OCHS definition of 'chronic condition'. Asthma was the most common chronic condition in the OCHS.

We use these two indicators rather than a more general measure of health status for three reasons. First, chronic conditions and functional limitations are both relatively objective measures and likely to reflect the longer run health conditions that would influence adult outcomes. Second, these are the childhood health indicators used by Case et al. (2005) in the most widely cited study to date of the impact of childhood health problems on adult outcomes. Third, the more global indicator of poor child health in the OCHS is quite different from the measure provided by most others surveys, including the NSLCY.[vi] As a result, we did not use this global measure in this study. In results not shown here, however, the estimates reported in the tables below do not differ substantially if we use an alternate binary indicator of a childhood physical health problem that is equal to one if the parent reports the presence a function limitation or a chronic medical condition or 'poor health'.

Our second indicator of childhood well-being takes on a value of 1 if the child had a conduct or emotional disorder. The OCHS provides a conduct scale and emotional

scale that are constructed from answers to a series of questions concerning behaviour and feelings. These questions are asked of the parent for children age 4-16, of the teacher for children age 4-11, and of the youth for children age 12 and over. A disorder was present if a threshold score was exceeded by any of the reported scores (parent, teacher or youth). The thresholds were established at the point which best discriminated the presence or absence of a disorder as diagnosed by a psychiatrist (Boyle et al. 1987). Table 1 indicates that 8% of the OCHS children had a conduct or emotional disorder in 1983. Five percent had a conduct problem and 6 % had an emotional problem.[vii] The prevalence of conduct and emotional problems in the OCHS is similar that reported by Dooley and Stewart (2007) for the NLSCY.

We also used measures of parental health from the 1983 OCHS which de Oliveira (2007) has found to be important in updating the findings of Currie and Stabile (2003) for the NLSCY. Two binary measures are available. The first is equal to one if one or both parents had a chronic medical condition or functional limitation. The second is equal to one if one or both parents had ever been 'treated for nerves'. Table 1 shows that the sample proportions of these variables are 30% and 24% respectively.

The bottom panel of Table 1 contains the sample means and proportions for the OCHS respondents in 2000 which are generally similar to the characteristics of samples from the SLID. (See Section 1 of the Web Appendix for more information.) As in the SLID, the OCHS 2000 respondents were asked to provide specific values (not categorical values) for annual earned income, hourly wage, and annual weeks and usual weekly hours of paid work. Our measure of annual hours of paid work is the product of the last two.

4. Multivariate Estimates

This section contains single equation estimates of the models in (1) and (2) above. Our descriptive approach is typical of much of this literature due to data limitations. As Case et al. (2005) point out, there are few data sets that are capable of providing even OLS estimates of equation (1) above and of α_4 in particular. The best opportunity afforded by the OCHS to move beyond OLS is the sibling fixed effects estimates at the end of this section.

4.1 Parental Income and Child Health

We begin with estimates of equation (2) in order to set the context for the examination of the extent to which child health might serve as a pathway for the intergenerational correlation in socio-economic status. Table 2 contains linear probability estimates for the likelihood in 1983 of a chronic condition or functional limitation (column 2) and the likelihood of a conduct or emotional disorder (column 3). The specifications are typical of the basic models estimated by Currie and Stabile (2003) and Dooley and Stewart (2007) for the NLSCY. In this and other tables, all models are estimated with pooled data for males and females unless otherwise noted. All models are also estimated with weighted data and standard errors are clustered by family. Throughout this section, we use the term 'significant' to refer to a p-value of 0.10 or less.

Family income is negatively related to each type of health problem though only

the estimate for the likelihood of a conduct or emotional disorder is significant. The implied income elasticities of approximately 0.15 and 0.25 are modest in size and consistent with the small income effects generally found in the literature especially for chronic conditions (Case et al. 2002) and behavioural and emotional problems (Dooley and Stewart 2007, Blau 1999 and Mayer 1997). Currie and Stabile (2003) did not report estimates for the likelihood of chronic conditions or functional limitations.

Parental health has a major impact. A parent with a chronic condition or functional limitation increases the likelihood of a childhood chronic condition or functional limitation by thirteen percentage points and the likelihood of a childhood conduct or emotional disorder by three points. A parent who was 'ever treated for nerves' increases the likelihood of both types of childhood problems by seven percentage points. In results not shown here, we find that the addition of the parental health variables to the model produces very little change in the other coefficients especially those for family income. Hence, the OCHS data indicate that the 'effect' of family income on child health is not mainly a proxy for parental health.

Most of the previous studies cited above report that parental education is positively correlated with child health. The estimates in Table 2, however, indicate that the children of the least educated mothers, who constitute 12 % of the sample, have a significantly lower likelihood of a chronic condition or functional limitation. The expected relationship is found for the likelihood of a childhood conduct or emotional disorder but the coefficients are not statistically significant.

As indicated in the literature review, Case et al. (2002) and Currie and Stabile (2003) reported that the income-health gradient steepens as children age but other studies

have not confirmed this pattern. We found mixed results with OCHS data (not shown here). Simple interactions of income and the child age dummies in Table 2 did not yield significant coefficients. However, when we estimated separate models for children age 4-10 and 11-16, the income effects are only significant for the older age group. Even for the older children, however, the size effects are only slightly larger and still yield modest income elasticities. Separately estimated models for girls and boys (not shown here) did not yield noticeably different coefficients.

4.2 Level of Education

We now turn to a consideration of the link between childhood health problems and adult outcomes, as specified in equation (1) above, beginning with schooling. Column 2 of Table 3 contains regression estimates for completed years of schooling in 2000. The values of the control variables in column 1 are for 1983 except for age of the respondent in 2000. The income coefficient implies a small elasticity of less than 0.1. Males have 0.26 of a year less than females. Respondents over age 24 have about two-thirds of a year more than those aged 22-24 and children of a mother with less than a high school diploma have one to two years less schooling than other children. Either type of health problem is associated with approximately 0.70 of year less of schooling. In results not shown, we found that the addition of the childhood health variables to the model has little impact on the other coefficient estimates. In particular, the parental income estimate declines by only 0.05 of a year thereby indicating that the positive effect of parental income on years of schooling does not work primarily through child health.

Column 3 of Table 3 contains linear probability estimates for the likelihood of obtaining at least a high school diploma or trade certificate. This level of education was attained by all but 8% of the sample. The coefficients for family income, males, and maternal education are all significant. A doubling of family income increases this conditional probability from 0.92 to 0.94. Males have a conditional probability that is 0.86. Parental schooling has a large impact in that the children of mothers with less than a high school degree have a likelihood of only 0.80 of a high school degree themselves. The coefficients for both types of health problems are negative but neither is significant.

Column 4 of Table 3 presents estimates for the likelihood of attaining a university degree. A doubling of family income increases the conditional probability of a university degree by 10 percentage points which translates into an elasticity of about one-third. Both males and the children of less educated mothers are substantially less likely to obtain postsecondary education. The impact of a childhood health problem is marked. A conduct or emotional disorder is associated with a reduction in the likelihood of a university degree of 15 percentage points from a sample proportion of 0.28 to 0.13. A chronic condition or functional limitation reduces this likelihood by 6 percentage points from 0.28 to 0.22.

In summary, a childhood health problem appears to have a negative association with the level of schooling and the size effect is especially large for the probability of a university degree. In results not shown here, the addition of these childhood health variables to our model has little impact on the other coefficient estimates which implies that parental income and education, in particular, are not merely serving as proxies (causal pathways) for childhood health status in simpler specifications. We estimated

models with interaction terms between parental income and each of the childhood health variables but none of the estimated interaction terms (not shown here) were significant which implies that family income did not have a major 'cushioning effect' for the impact of a health problem on schooling attainment. We also found no substantial differences in coefficients for women and men when separate models were estimated.

4.3 Adult Health

The OCHS 2000 provided summary measures of adult physical health and mental health, both of which are derived from the SF-36 which is a widely-used, multi-purpose, short-form health survey (Ware, Snow, Kosinski, & Gandek, 1993). We used standardized versions of these summary measures in the regressions which are reported in Table 4. For these measures of adult health, a higher value means better health unlike our measures of childhood problems.

All of the models indicate a positive but non-significant association between family income in childhood and adult health. Columns 2 and 4 indicate that a chronic condition or functional limitation in childhood is associated with a decline in adult physical health of 0.32 of a standard deviation (SD) and a decline in adult mental health of 0.16 of a SD. A conduct or emotional disorder in childhood is associated with a decline in adult mental health of 0.24 of a standard deviation (SD). The models in columns 3 and 5 include years of schooling and demonstrate the well-known positive relationship between adult health and education. Note, however, that the coefficients for childhood health problems remain significant and of approximately the same magnitude

when years of schooling is added. Hence, there appears to be a link between childhood and adult health that is not primarily mediated by schooling.

We found the same basic results as in Table 4 when we used the following alternative measures of adult health: a binary value for a 'low value' (less than –0.5 of a SD) of the continuous summary measures used in Table 4; the presence or not of an adult chronic medical condition; a single self assessed adult health measure (excellent, very good, good, fair or poor); and a binary measure based on the single health measure (excellent or very good versus good, fair or poor). For adult health, as with educational outcomes, the estimated interaction terms (not shown here) between parental income and the childhood health variables were not significant and no substantial differences were found in coefficients for women and men when separate models were estimated.

4.4 Labour Force Outcomes

Most previous inter-generational studies of labour market outcomes are limited to measures of annual earnings or income but the OCHS data are richer. We report regression estimates both for annual earnings and hourly wages using the sample of OCHS 2000 respondents with positive values for these outcomes and for the probability of any annual paid work and annual hours of paid work using all OCHS 2000 respondents with both positive and zero hours. We also follow the practice common in this literature of limiting the estimation samples to persons age 25 and over in order to measure permanent outcomes at an appropriate stage of the life cycle. The OCHS fall short of the ideal recommended by Haider and Solon (2006) of capturing fathers and sons

in the early 40s. This shortcoming is true of some of the other Canadian literature, e.g., Corak and Heisz (1999) where child earnings outcomes are also measured when the children are in the early 30s. Our early runs revealed noticeably different estimates for men and women. Hence, separate models are reported in Table 5.

Table 5a presents the estimates for (log) annual earnings. The coefficient for family income is significant for males with a point estimate of 0.14 in column 2. Corak (2006) cites a value of 0.19 as the best estimate for this 'inter-generational elasticity' among males in studies that have multiple years of earnings for fathers and sons. A somewhat lower value for our estimate is to be expected given that we have parental income rather than paternal earnings and only one year of data in each generation. The family income coefficients for females have noticeably lower values and large standard errors, a finding which is also consistent with the literature. Female earnings are strongly correlated with maternal education, a result which is not true for the earnings of male respondents.

Neither type of childhood health problem is significantly associated with earnings but the results in columns 4 and 7 show that the adult health measures are significantly associated with earnings save in the case of physical health for females. The results in columns 3, 4, 6 and 7 also show the familiar finding that years of education are positively associated with earnings with the effect, in this case, being larger for females than for males. For males, the coefficient on family income drops when adult education is added to the model indicating that schooling is one pathway by which parental income influences the earnings of children. The same is not true of the adult health variables.

Table 5b presents the estimates for (log) hourly wages. The coefficients for

family income are significant for males and about three-quarters the size of the income coefficients for annual earnings in the previous table. This implies that the majority of the 'effect' of family income on annual earnings comes through wages rather than hours of work (a previously untestable hypothesis with Canadian data). As with annual earnings in Table 5a, family income is not significantly associated with female wages but maternal education is.

Another key difference between the sexes is that childhood health problems are significantly and negatively associated with female wages. When years of schooling are added to the model in column 8, the coefficients for both childhood health problems decline in absolute value, as one would expect, but remain statistically significant. The coefficients for years of schooling in Table 5b are virtually the same as those in Table 5a which implies the impact of schooling on earnings comes mainly through wages rather than hours of paid work. The opposite appears to be true for adult health status. In Table 5b, there are no significant coefficients for adult health whereas in Table 5a, in contrast, the adult health coefficients were all significant save for adult physical health in the case of female earnings.

Table 5c presents the linear probability estimates for the likelihood of positive annual hours of paid work. In contrast with the rest of Table 5, family income has a significant effect on this outcome only for females. Also, in contrast with the other labour market outcomes, maternal education is associated with the likelihood of positive hours for men but not for women. A childhood conduct or emotional disorder is associated with a large drop of 8 points in the likelihood of positive hours among males. Adult

health is positively and significantly associated with the probability of positive annual hours for both sexes save in the case of mental health for females.

Table 5d presents the regression estimates for annual hours of paid work among those with positive and zero hours. As would be predicted from Tables 5a and 5b, family income has a significant effect for males. Neither type of childhood health problem is significantly associated with annual hours of paid work. As noted above, childhood health problems have negative effects on both annual earnings and hourly wages for females but only the latter is significant. It appears that the reason for this is the offsetting effect of the positive, though non-significant, association between childhood health problems and annual hours of paid work in Table 5d. Years of schooling has the expected positive association with hours as does adult health save in the case of adult physical health for females.

For females, we estimated the models in Table 5 including measures for the number and ages of children. These variables usually had the expected effects (children are associated with lower earnings, wages and hours of paid work) but their presence did not markedly change coefficients for the other variables. Finally, we also estimated the models in Table 5 including interaction terms between parental income and the childhood health variables. The interaction coefficients were not significant and led to no substantial differences in other coefficients with the following exceptions. A childhood chronic condition or functional limitation among males is associated with a lower likelihood of positive annual hours of market work but this effect is smaller for respondents from higher income families. For females, the negative impact of both types of childhood health problems on annual hours of market work was smaller for those

women who grew up in higher income families. These were the only instances that we found in which parental income appears to lessen or cushion the impact of a childhood health problem.

4.5 Sibling Fixed Effects Estimates

Table 6 contains both the sibling fixed effects (FE) estimates of the effects of each childhood health problem on the adult outcomes and least squares estimates obtained with the fixed effects sample (number of children > 1). We have also included the p-value for a test of the hypothesis that the difference between the FE and least squares estimates is equal to zero. The least squares estimates in Table 6 are generally similar to those obtained with the full sample in Tables 3 through 5. The exceptions are the absence in Table 6 of a significant least squares effect of a chronic condition or functional limitation on adult mental health or female wages and the presence of a significant effect of a conduct or emotional disorder on male earnings and wages. The fixed effects estimates generally have smaller (in absolute size) point estimates and are significant in fewer cases than the least squares estimates. Perhaps most noticeable is the absence of a significant FE estimate for the effect of a conduct or emotional disorder on years of schooling, the likelihood of a university degree, adult mental health, and the likelihood of male positive paid hours. The FE estimates for the effect of a chronic condition or functional limitation on the likelihood of a university degree and female wages are also non-significant. However, when we test whether the FE results are the same as those estimated by OLS, we generally cannot reject the hypothesis that they are

the same. The notable exception is for having a university degree, where the FE results are essentially zero (for both health measures), and statistically different than the OLS (significant negative) estimates. This suggests that the university outcome may be driven by family heterogeneity that is confounded with childhood health, or alternatively, that all siblings are adversely affected by the health of other children in the family. With that exception, the FE results do not overturn our OLS conclusions, and we comment further on this point at the end of the next section.

5. Summary and Conclusion

The Ontario Child Health Study (OCHS) is the first Canadian socio-economic data set that provides an opportunity to examine intergenerational links between economic and health status. We use the OCHS to examine (1) the relationship between childhood health problems and various young adult outcomes and (2) the role that health status plays in the intergenerational correlation of economic outcomes. Our analysis begins with a look at the association between parental socioeconomic status and the prevalence of a childhood chronic condition, a functional limitation or a conduct or emotional disorder. In each case, we report the modest income elasticities usually found in this literature. Parental health is strongly related to childhood health outcomes but our results indicate that family income is not serving mainly a proxy for parental health.

Our least squares estimates indicate that childhood health problems are negatively associated with educational attainment, especially the probability of a university degree, and the health status of young adults. Our results are qualitatively similar to those of

Case, Fertig and Paxson (2005) who use different outcome measures and Smith (2008) who uses a very different retrospective measure of childhood health. Our OCHS results also imply that childhood health is not mainly serving as a causal pathway for the link between parental income and education and young adult outcomes. Furthermore, the association between childhood health and adult health is not primarily mediated by the children's schooling attainment. Finally, we found no evidence that parental income has a 'cushioning effect', i.e., that the impact of a childhood health problem on either schooling or health status in young adulthood varies with parental income.

Our estimate of the effect of parental income on male earnings is consistent with previous Canadian estimates and we generally find the expected positive links among education, health and labour market outcomes in young adulthood. However, the only instances in which a child health problem had a significant effect on labour market outcomes were wages for females and the likelihood of positive hours of paid work for males. Hence, our results imply that childhood health problems influence adult labour force outcomes, especially for males, mainly through adult levels of schooling and health.

Case, Fertig and Paxson and Smith generally found stronger direct labour force effects of childhood health problems using data from the UK and USA respectively. Those countries also generally exhibit stronger inter-generational links in earnings than found in Canadian data (Corak 2006). Hence, the OCHS evidence of a comparatively weak direct link between childhood health and adult labour force outcomes may be one more reflection of the greater degree of intergenerational mobility in Canada. Comparison with those two other studies, however, must be undertaken with caution.

Case, Fertig and Paxson did not analyze outcomes for women and used quite different outcome measures for men (full-time versus part-time employment and occupation). Smith used a very different retrospective measure of childhood health.

One final but important note of caution is that our siblings fixed effects estimates often fail to confirm our least squares estimates of the effects of childhood health problems on adult outcomes. This finding may be testimony to the Canadian health care system, social safety net, and consequent high degree of intergenerational mobility. This finding also may reflect some of the limitations of the OCHS data. The OCHS provides a very useful start but further Canadian research with larger samples and richer data sets is clearly needed on this topic. If the original NLSCY cohorts are followed beyond the age of 25, then this data set will provide an excellent opportunity to revisit these very important questions.

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[i] Currie et al. (2006) also reported that the income-health gradient did not increase with child age but Case, Lee and Paxson (2008) have recently reanalyzed their English data and found that it does

[ii] Currie and Stabile use the longitudinal nature of the NLSCY to delve more deeply into the reasons why low-income children have poorer physical health. Specifically, they find that both low- and high-income children recuperate from health shocks at the same rate, but that low-income children are subject to more frequent health shocks than their high-income counterparts.

[iii] For examples of studies that consider the impact of low birthweight and infant health on adult outcomes, see Black, Devereux and Salvanes (2005) and Oreopoulos et al. (2006).

[iv] See Section 3 of the Web Appendix for a discussion of the 1987 OCHS Follow-up Survey.

[v] Those not participating in data collection included the following: 51 subjects were unable to complete an interview due to death or physical or mental condition; 380 were untraced; 301 refused; and 153 were classified as special circumstances (usually could not be contacted during the survey period).

[vi] Most surveys ask parents to rank child health on a five-category scale from poor to

excellent. The binary indicator of poor health in the OCHS is equal to one if the child has a score in the bottom quintile of a general health scale. This health scale summarizes the respondent's answers to four questions (child's health is excellent, seems to resist illness, seems less healthy than other children, and usually catches whatever is going around) using a five point scale (definitely true=5, mostly true=4, don't know=3, mostly false=2 and definitely false=1). Hence, the general scale ranges in value from 4 to 20.

[vii] A third disorder for which there is an indicator in the OCHS 1983 is hyperactivity. We did not use this measure in our study. Hyperactivity has virtually no empirical link with parent socioeconomic status, especially income, in the OCHS or the NLSCY. Our results (not shown) do not differ substantially if we use an alternate binary indicator of a childhood mental health problem that is equal to one if the parent reports the presence of a conduct, emotional or hyperactivity disorder.

Table 1

Means and Proportions for Regression Samples

	Age 21-35	Age 25-35
Total Number of Observations	1801	1430
1982 Family Income (2000$)	57,200	58,674
1983 Male	51%	54%
1983 Age of Mother	38	39
1983 Number of Children	2	2.1
1983 Mother's Less than Grade 9	12%	14%
1983 Mother's Grade 9-13	58%	57%
1983 Mother's Post-secondary Degree	34%	29%
1983 Small Urban /Rural Residence	34%	36%
1983 Lone Mother	9%	8%
1983 Chronic Condition or Functional Limitation	18%	18%
1983 Conduct or Emotional Disorder	8%	9%
1983 One or Both Parents with Chronic Condition or Functional Limitation	30%	33%
1983 One or Both Parents Ever Treated for Nerves	24%	25%
2000 Years of Education	15.2	15.6
2000 Less than High School	8%	6%
2000 High School or Trade Certificate	38%	33%
2000 Post-secondary, not University	25%	27%
2000 University Degree	29%	34%
2000 Attending School	15%	9%
2000 Personal Earnings Given Positive Earnings	--	40,937
2000 Hourly Wage Given Positive Earnings	--	21.82
2000 Proportion with Positive Hours Paid Work	--	86%
2000 Annual Hours Paid Work (Total)	--	1637

Table 2
Logit for the Likelihood of a Child Health Problem in 1983*

(1) 1983 Values	(2) Chronic Condition or Functional Limitation	(3) Conduct or Emotional Disorder
Log Family Income	-0.030	-0.035**
	(0.022)	(0.017)
Age 7-11	0.015	0.051***
	(0.027)	(0.018)
Age 12-16	0.056*	0.117***
	(0.031)	(0.021)
Male	0.050**	0.032**
	(0.022)	(0.015)
Age of Mother	-0.003	-0.007***
	(0.002)	(0.002)
Lone Mother	0.008	-0.004
	(0.046)	(0.032)
Number of Children	-0.008	-0.001
	(0.014)	(0.010)
Rural Residence	-0.005	-0.013
	(0.021)	(0.014)
Mother Less than HS	-0.080**	-0.002
	(0.037)	(0.028)
Mother HS only	-0.033	-0.001
	(0.025)	(0.016)
Parent with Chronic Condition or Functional Limitation	0.128***	0.033*
	(0.027)	(0.017)
Parent Ever Treated for Nerves	0.070**	0.070***
	(0.028)	(0.022)
Constant	0.540**	0.602***
	(0.261)	(0.199)
Number Observations	1801	1801
R Squared	0.05	0.05
Sample Proportion	0.17	0.08

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 3
Adult Levels of Schooling in 2000*

(1) 1983 Values Except Where Indicated	(2) Years of Schooling	(3) Probability of At Least High School	(4) Probability of University Degree
Log Family Income	0.792***	0.044***	0.104***
	(0.140)	(0.017)	(0.023)
Age 25-29 in 2000	0.615***	0.032	0.118***
	(0.168)	(0.022)	(0.029)
Age 30-35 in 2000	0.699***	0.030	0.113***
	(0.205)	(0.023)	(0.035)
Male	-0.255*	-0.041***	-0.051**
	(0.132)	(0.015)	(0.023)
Age of Mother	0.022	-0.000	0.005**
	(0.014)	(0.001)	(0.002)
Lone Mother	-0.086	-0.041	0.039
	(0.330)	(0.038)	(0.050)
Number of Children	-0.003	0.005	0.010
	(0.097)	(0.010)	(0.017)
Rural Residence	-0.291**	-0.016	-0.035
	(0.144)	(0.014)	(0.025)
Mother Less than HS	-1.956***	-0.118***	-0.184***
	(0.274)	(0.031)	(0.048)
Mother HS only	-1.207***	-0.045***	-0.212***
	(0.162)	(0.013)	(0.031)
Conduct or Emotional Disorder	-0.741***	-0.040	-0.150***
	(0.264)	(0.035)	(0.033)
Chronic Condition or Functional Limitation	-0.688***	-0.025	-0.062**
	(0.182)	(0.021)	(0.028)
Constant	6.681***	0.495***	-0.927***
	(1.573)	(0.178)	(0.272)
Number Observations	1801	1801	1801
R-square	0.17	0.05	0.13
Sample Mean or Proportion	15.60	0.92	0.28

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 4
Adult Levels of Health in 2000*

(1) 1983 Values Except Where Indicated	(2) Adult Physical Health	(3) Adult Physical Health	(4) Adult Mental Health	(5) Adult Mental Health
Log Family Income	0.055	0.017	0.071	0.047
	(0.063)	(0.064)	(0.062)	(0.061)
Age 25-29	-0.081	-0.111	0.137	0.119
	(0.072)	(0.072)	(0.087)	(0.087)
Age 30-35	-0.130	-0.165**	0.190*	0.169
	(0.080)	(0.081)	(0.105)	(0.104)
Male	0.136**	0.148***	0.178***	0.186***
	(0.054)	(0.053)	(0.062)	(0.061)
Age of Mother	0.007	0.005	0.006	0.005
	(0.005)	(0.005)	(0.005)	(0.005)
Lone Mother	-0.141	-0.136	-0.146	-0.143
	(0.152)	(0.149)	(0.195)	(0.193)
Number of Children	0.087**	0.087**	0.063	0.063
	(0.038)	(0.038)	(0.042)	(0.042)
Rural Residence	0.064	0.078	0.073	0.081
	(0.051)	(0.051)	(0.059)	(0.060)
Mother Less than HS	0.111	0.207**	-0.135	-0.076
	(0.095)	(0.100)	(0.109)	(0.113)
Mother HS only	0.034	0.094	-0.010	0.026
	(0.063)	(0.067)	(0.065)	(0.066)
Conduct or Emotional Disorder	-0.070	-0.033	-0.238**	-0.216*
	(0.122)	(0.119)	(0.119)	(0.118)
Chronic Condition or Functional Limitation	-0.316***	-0.282***	-0.155**	-0.134**
	(0.084)	(0.083)	(0.070)	(0.068)
Years of Education		0.049***		0.030***
		(0.013)		(0.011)
Constant	-0.997	-1.325*	-1.320*	-1.522**
	(0.736)	(0.735)	(0.720)	(0.737)
Number Observations	1801	1801	1801	1801
R-square	0.03	0.05	0.04	0.04
Sample Mean (standardized)		0.05		0.04

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 5 (a)
Adult Ln Annual Earnings

(1)	(2)	(3)	(4)	(5)	(6)	(7)
1983 Values Except Where Indicated		Males			Females	
Log Family Income	0.139**	0.116**	0.118**	0.086	0.028	0.020
	(0.057)	(0.058)	(0.057)	(0.063)	(0.060)	(0.059)
Age 30-35	0.342***	0.326***	0.327***	0.128	0.132	0.134
	(0.068)	(0.069)	(0.067)	(0.082)	(0.082)	(0.081)
Age of Mother	0.009	0.009	0.007	0.014*	0.011	0.011
	(0.007)	(0.007)	(0.007)	(0.008)	(0.007)	(0.007)
Lone Mother	0.086	0.061	0.041	-0.082	-0.035	-0.024
	(0.141)	(0.145)	(0.140)	(0.138)	(0.133)	(0.133)
Number of Children	0.151***	0.141***	0.129**	-0.017	-0.017	-0.024
	(0.052)	(0.052)	(0.051)	(0.052)	(0.050)	(0.051)
Rural Residence	0.054	0.073	0.054	-0.199***	-0.180**	-0.187***
	(0.058)	(0.058)	(0.057)	(0.075)	(0.071)	(0.070)
Mother Less than HS	-0.101	-0.027	-0.016	-0.265**	-0.145	-0.133
	(0.113)	(0.105)	(0.106)	(0.109)	(0.104)	(0.104)
Mother HS only	-0.018	0.035	0.029	-0.198**	-0.143*	-0.147*
	(0.081)	(0.081)	(0.080)	(0.080)	(0.077)	(0.077)
Conduct or Emotional Disorder	-0.005	0.010	-0.017	-0.168	-0.061	-0.022
	(0.096)	(0.095)	(0.092)	(0.115)	(0.116)	(0.122)
Chronic Condition or Functional Limitation	0.024	0.046	0.098	-0.033	0.014	0.026
	(0.077)	(0.077)	(0.077)	(0.083)	(0.084)	(0.084)
Years of Education		0.031**	0.025**		0.078***	0.076***
		(0.013)	(0.012)		(0.016)	(0.016)
Adult Physical Health			0.125***			0.017
			(0.041)			(0.032)
Adult Mental Health			0.088*			0.065*
			(0.046)			(0.037)
Constant	8.198***	7.971***	8.094***	8.882***	8.311***	8.471***
	(0.680)	(0.696)	(0.672)	(0.760)	(0.721)	(0.725)
Number Observations	615	615	615	591	591	591
R-square	0.12	0.13	0.15	0.08	0.13	0.14
Sample Mean	47706			31900		

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 5 (b)
Adult Log Hourly Wages

(1) 1983 Values Except Where Indicated	(2)	(3) Males	(4)	(5)	(6) Females	(7)
Log Family Income	0.113***	0.083*	0.084*	0.042	-0.016	-0.017
	(0.042)	(0.043)	(0.043)	(0.048)	(0.042)	(0.042)
Age 30-35	0.191***	0.171***	0.170***	0.144***	0.148***	0.149***
	(0.046)	(0.046)	(0.046)	(0.047)	(0.045)	(0.046)
Age of Mother	0.004	0.003	0.003	0.008	0.005	0.005
	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.005)
Lone Mother	0.115	0.083	0.073	0.049	0.096	0.095
	(0.133)	(0.137)	(0.139)	(0.110)	(0.098)	(0.100)
Number of Children	0.056*	0.043	0.039	-0.001	-0.001	-0.002
	(0.030)	(0.028)	(0.028)	(0.032)	(0.029)	(0.029)
Rural Residence	-0.065	-0.039	-0.045	-0.114***	-0.096**	-0.097**
	(0.044)	(0.044)	(0.044)	(0.043)	(0.039)	(0.040)
Mother Less than HS	-0.115	-0.020	-0.010	-0.343***	-0.224***	-0.225***
	(0.088)	(0.081)	(0.080)	(0.079)	(0.074)	(0.074)
Mother HS only	-0.070	-0.002	-0.000	-0.191***	-0.137***	-0.137***
	(0.057)	(0.058)	(0.058)	(0.051)	(0.047)	(0.047)
Conduct or Emotional Disorder	-0.086	-0.067	-0.074	-0.278***	-0.172**	-0.170**
	(0.058)	(0.058)	(0.058)	(0.081)	(0.078)	(0.079)
Chronic Condition or Functional Limitation	-0.019	0.009	0.016	-0.144**	-0.098*	-0.097*
	(0.065)	(0.066)	(0.066)	(0.058)	(0.055)	(0.056)
Years of Education		0.039***	0.038***		0.077***	0.077***
		(0.010)	(0.009)		(0.009)	(0.009)
Adult Physical Health			0.012			0.005
			(0.035)			(0.021)
Adult Mental Health			0.053			0.004
			(0.032)			(0.021)
Constant	1.504***	1.211**	1.240**	2.255***	1.689***	1.710***
	(0.491)	(0.491)	(0.487)	(0.593)	(0.513)	(0.503)
Number Observations	615	615	615	591	591	591
R-square	0.08	0.12	0.13	0.13	0.25	0.25
Sample Mean	23.14			19.77		

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 5 (c)
Probablity of Positive Adult Annual Hours of Paid Work

(1) 1983 Values Except Where Indicated	(2)	(3) Males	(4)	(5)	(6) Females	(7)
Log Family Income	0.018	0.014	0.016	0.060*	0.042	0.038
	(0.016)	(0.016)	(0.015)	(0.036)	(0.035)	(0.034)
Age 30-35	-0.006	-0.009	-0.013	-0.055*	-0.051*	-0.048*
	(0.016)	(0.016)	(0.015)	(0.028)	(0.027)	(0.028)
Age of Mother	0.001	0.001	0.000	0.002	0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)	(0.002)
Lone Mother	-0.034	-0.037	-0.024	-0.032	-0.025	-0.024
	(0.051)	(0.051)	(0.039)	(0.069)	(0.067)	(0.066)
Number of Children	0.012	0.010	0.005	-0.016	-0.015	-0.018
	(0.010)	(0.010)	(0.010)	(0.017)	(0.017)	(0.017)
Rural Residence	-0.008	-0.005	-0.010	0.049**	0.052**	0.048**
	(0.014)	(0.014)	(0.014)	(0.024)	(0.024)	(0.024)
Mother Less than HS	-0.039	-0.025	-0.022	-0.030	0.000	-0.009
	(0.028)	(0.029)	(0.029)	(0.047)	(0.048)	(0.048)
Mother HS only	-0.013	-0.004	-0.008	0.000	0.015	0.014
	(0.011)	(0.010)	(0.010)	(0.027)	(0.027)	(0.027)
Conduct or Emotional Disorder	-0.077*	-0.074*	-0.066**	-0.002	0.025	0.030
	(0.042)	(0.041)	(0.033)	(0.049)	(0.048)	(0.048)
Chronic Condition or Functional Limitation	-0.010	-0.005	0.015	-0.027	-0.017	-0.009
	(0.020)	(0.019)	(0.015)	(0.035)	(0.035)	(0.033)
Years of Education		0.006**	0.003		0.020***	0.018***
		(0.003)	(0.003)		(0.005)	(0.005)
Adult Physical Health			0.042**			0.029**
			(0.017)			(0.014)
Adult Mental Health			0.033*			0.006
			(0.018)			(0.013)
Constant	0.747***	0.706***	0.748***	0.244	0.145	0.236
	(0.195)	(0.198)	(0.190)	(0.406)	(0.394)	(0.391)
Number Observations	683	683	683	747	747	747
R-square	0.05	0.06	0.13	0.04	0.07	0.08
Sample Mean	0.90			0.79		

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 5 (d)
Adult Annual Hours Including Zero Hours

(1) 1983 Values Except Where Indicated	(2)	(3) Males	(4)	(5)	(6) Females	(7)
Log Family Income	132.2*	109.7	118.9*	123.7	77.6	74.1
	(68.0)	(68.8)	(66.3)	(84.3)	(84.9)	(83.6)
Age 30-35	121.0*	108.6	92.8	-121.7	-112.6	-111.9
	(69.8)	(69.8)	(66.1)	(80.9)	(80.4)	(81.0)
Age of Mother	6.7	6.1	4.7	2.1	-0.2	-1.0
	(6.2)	(6.2)	(5.8)	(6.9)	(6.8)	(6.8)
Lone Mother	-116.2	-128.9	-64.6	-59.1	-41.3	-21.2
	(181.1)	(173.8)	(140.4)	(159.5)	(154.6)	(153.7)
Number of Children	101.6**	91.2*	68.6	-24.4	-21.7	-26.5
	(48.3)	(47.2)	(46.3)	(53.9)	(52.8)	(52.6)
Rural Residence	103.0	120.9*	96.4	18.3	26.2	23.5
	(64.4)	(64.5)	(62.2)	(75.3)	(74.3)	(74.7)
Mother Less than HS	-52.4	16.9	25.1	-115.2	-37.1	-27.7
	(109.0)	(110.0)	(107.5)	(136.4)	(135.5)	(134.6)
Mother HS only	124.7*	171.4**	151.1**	-33.7	4.6	-2.1
	(73.2)	(73.6)	(70.5)	(90.6)	(91.4)	(90.9)
Conduct or Emotional Disorder	-120.5	-103.4	-70.6	40.7	108.2	136.3
	(122.3)	(121.3)	(98.5)	(150.5)	(152.0)	(154.0)
Chronic Condition or Functional Limitation	61.0	87.0	180.4**	41.4	68.3	78.2
	(86.8)	(85.5)	(79.1)	(102.4)	(104.2)	(103.6)
Years of Education		29.7**	15.8		50.6***	48.9***
		(12.7)	(12.1)		(15.0)	(14.9)
Adult Physical Health			211.4***			7.1
			(39.0)			(32.7)
Adult Mental Health			129.4***			65.1*
			(37.9)			(36.7)
Constant	-3.2	-211.4	-20.6	233.4	-21.5	86.0
	(808.5)	(809.9)	(782.0)	(972.2)	(954.0)	(938.5)
Number Observations	683	683	683	747	747	747
R-square	0.06	0.07	0.14	0.02	0.04	0.05
Sample Mean	1914			1360		

Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01

Table 6
Siblings Fixed Effects Estimates and Least Squares Estimates with FE Sample

		Years of Schooling	At Least High School	University Degree	Physical Health	Mental Health
Fixed Effects	Conduct or Emotional Disorder	-0.423	0.044	-0.063	-0.123	-0.064
		(0.313)	(0.064)	(0.053)	(0.233)	(0.165)
Least Squares	Conduct or Emotional Disorder	-0.922***	-0.023	-0.164***	-0.093	-0.245*
		(0.343)	(0.043)	(0.042)	(0.159)	(0.144)
Test: FE = Least Squares	p-value	0.10	0.14	0.02	0.93	0.17
Fixed Effects	Chronic Condition or Functional Limitation	-0.474**	-0.073	0.023	-0.273**	-0.063
		(0.243)	(0.044)	(0.053)	(0.131)	(0.114)
Least Squares	Chronic Condition or Functional Limitation	-0.643***	-0.035	-0.063*	-0.242***	-0.082
		(0.223)	(0.033)	(0.05)	(0.092)	(0.082)
Test: FE = Least Squares	p-value	0.45	0.15	0.06	0.80	0.76
No. Observations		1075	1075	1075	1075	1075

		Ln Annual Earnings, Earnings >0		Hourly Wages, Earnings >0	
		Males	Females	Males	Females
Fixed Effects	Conduct or Emotional Disorder	-0.083	-0.022	-0.093	-0.352***
		(0.123)	(0.344)	(0.142)	(0.112)
Least Squares	Conduct or Emotional Disorder	-0.173*	-0.162	-0.144**	-0.253***
		(0.093)	(0.172)	(0.074)	(0.122)
Test: FE = Least Squares	p-value	0.37	0.64	0.69	0.45
Fixed Effects	Chronic Condition or Functional Limitation	0.032	-0.163	-0.103	0.142
		(0.142)	(0.203)	(0.183)	(0.202)
Least Squares	Chronic Condition or Functional Limitation	-0.072	0.043	-0.064	-0.042
		(0.072)	(0.113)	(0.074)	(0.082)
Test: FE = Least Squares	p-value	0.48	0.34	0.79	0.32
No. Observations		408	361	408	361

		Probability Positive Paid Hours		Annual Hours Paid Work, All Hours	
		Males	Females	Males	Females
Fixed Effects	Conduct or Emotional Disorder	0.001	-0.022	285.5	68.2
		(0.001)	(0.052)	(252.8)	(338.6)
Least Squares	Conduct or Emotional Disorder	-0.092*	0.033	-90.5	41.0
		(0.052)	(0.063)	(144.2)	(202.2)
Test: FE = Least Squares	p-value	0.07	0.34	0.04	0.92
Fixed Effects	Chronic Condition or Functional Limitation	0.001	-0.012	-42.1	21.4
		(0.001)	(0.092)	(282.3)	(269.5)
Least Squares	Chronic Condition or Functional Limitation	0.013	-0.042	-84.8	-23.7
		(0.023)	(0.052)	(93.6)	(144.4)
Test: FE = Least Squares	p-value	0.57	0.71	0.87	0.85
No. Observations		444	447	444	447

Standard errors in parentheses Standard errors in parentheses *p<0.10, **p<0.05, ***p<0.01